

WHAT IS CLAIMED IS

1. An observation apparatus comprising:

an optical microscope for observing an optical image of
an object in a field of view of the optical microscope, the
optical microscope including a first optical system for

5 forming the optical image of the object;

a first display capable of displaying a first image which
is different from the optical image;

a second optical system for optically transmitting the
first image to display the first image in the field of view of
10 the optical microscope;

a second display capable of displaying a second image
which is different from the optical image and the first image,
and

a third optical system for optically transmitting the
15 second image to display the second image in the field of view
of the optical microscope.

2. The observation apparatus according to claim 1,
wherein the second optical system is configured to superpose
the first image on a part of the optical image.

3. The observation apparatus according to claim 2,
wherein the third optical system is configured to superpose
the second image on a part of the optical image.

4. The observation apparatus according to claim 1, wherein the second optical system forms a projection optical system for projecting the first image on a part of the optical image.

5. The observation apparatus according to claim 4, wherein the third optical system forms a projection optical system for projecting the second image on a part of the optical image.

6. The observation apparatus according to claim 1, further comprising a computer electrically connected to the first display, wherein the computer controls a size of the first image displayed on the first display so as to change a size of the first image displayed in the field of view in accordance with a magnification of the optical image observed by the optical microscope.

7. The observation apparatus according to claim 1, wherein the first image is an image obtained by one selected from the group consisting of an endoscope, a rigid scope and an ultrasonic diagnostic apparatus.

8. The observation apparatus according to claim 1, wherein:

the first image is an image of the object obtained by means of an observation unit selected from the group

5 consisting of an endoscope and an ultrasonic probe; and

the first image and the second image include one of (i) a combination of the first image obtained by means of the observation unit and an image indicative of an observation position or direction of the observation unit and (ii) a

10 combination of a preoperative/mid-operative diagnostic image selected from the group consisting of image-processed fluorescent observational images obtained by means of the observation unit and the image indicative of the observational position or direction of the observation unit and a tumor
15 position display marker image.

9. The observation apparatus according to claim 1, wherein the second image is a marker image.

10. An operating microscope apparatus comprising:

an observational optical system for forming an optical image of an object including an affected region;

5 observational means capable of observing the optical image in a field of view of the observational optical system;

first display means for observably displaying a first image different from the optical image in the field of view of the observational means; and

10 second display means for observably displaying a second
image different from the optical image and first image in the
field of view of the observational means.

11. The operating microscope apparatus according to
claim 10, wherein the first display means includes a display
which displays the first image and an image projection optical
system which projects the first image into the field of view.

12. The operating microscope apparatus according to
claim 11, wherein the image projection optical system projects
a part of the optical image and the first image.

13. The operating microscope apparatus according to
claim 10, wherein the second display means includes an image
superposition optical system which superposes an image on a
part of the optical image.

14. The operating microscope apparatus according to
claim 10, further comprising switching means which
independently switches display/non-display of the first and
second images of the object.

15. The operating microscope apparatus according to claim 10, wherein:

the first image is an image of the object obtained by means of object observing means selected from the group consisting of an endoscope and an ultrasonic probe; and

the first and second images include one of (i) a combination of the first image obtained by means of the object observing means and an image indicative of an observational position or direction of the object observing means and (ii) a combination of a preoperative/mid-operative diagnostic image selected from the group consisting of image-processed fluorescent observational images and the image indicative of the observational position or direction of the object observing means and a tumor position display marker image.

16. A surgical observational system comprising:

an observational optical system for forming an optical image of an object including an affected region;

first observational means for observing the optical image;

a memory which stores a preoperative diagnostic image of the object including the affected region;

second observational means which obtains an image showing a desired area of the object, the desired area found in the optical image, the second observational means being different

from the first observational means in at least one of
observational direction and observational method;

detecting means which detects the relative position of
the first and second observational means in three dimensions;

15 first display means which displays the image showing the
desired area of the object obtained by the second
observational means on the optical image observed by the first
observational means in accordance, with the relative position
of the first and second observational means in three

20 dimensions; and

second display means which reads out the preoperative
diagnostic image including the desired area from the memory
and displays the preoperative diagnostic image on the optical
image observed by the first observational means in accordance
25 with the relative position of the first and second
observational means in three dimensions.

17. The surgical observational system according to
claim 16, wherein the second observational means is one
selected from the group consisting of an endoscope, rigid
scope and ultrasonic diagnostic apparatus.

18. A surgical observational system comprising:

a first observational apparatus including a first optical
system which forms an optical image of an object;

a second observational apparatus different from the first
5 observational apparatus in at least one of observational
direction and observational method, the second observational
apparatus obtaining an image showing a desired area of the
object, the desired area found in the optical image;

a first display capable of displaying the image showing
10 the desired area of the object obtained by the second
observational apparatus;

a second optical system optically coupled to the first
optical system, the image showing the desired area of the
object displayed on the first display entering into the second
15 optical system, being superposed on the optical image and
observed by the first observational apparatus;

a memory which stores a preoperative diagnostic image of
the object;

a second display capable of displaying the preoperative
20 diagnostic image;

a third optical system optically coupled to the first
optical system, the image of the preoperative diagnostic image
displayed on the second display entering into the third
optical system, being superposed on the optical image and
25 observed by the first observational apparatus;

a detector capable of detecting the relative position of
the first and second observational apparatuses in three
dimensions; and

30 a computer electrically connected to the first display,
second display and detector, the computer controlling the
display position of the image showing the desired area on the
first display such that the image showing the desired area
obtained by the second observational apparatus is superposed
on the desired area of the optical image observed by the first
35 observational apparatus in accordance with the result of the
detection by the detector, and the computer reading out the
preoperative diagnostic image including the desired area from
the memory in accordance with the result of the detection and
displaying it on the second display.

19. The surgical observational system according to
claim 18, wherein the second observational apparatus is one
selected from the group consisting of an endoscope, rigid
scope and ultrasonic diagnostic apparatus.

20. The surgical observational system according to
claim 19, wherein the computer is further capable of setting
the size of the image showing the desired area, the image
showing the desired area superposed on the desired area of the
5 optical image and displayed on the first display in accordance
with a magnification of the optical image observed by the
first observational apparatus.